



The American Association for Laboratory Accreditation

World Class Accreditation

Accredited Laboratory

A2LA has accredited

TRIALON CORPORATION RELIABILITY TECHNICAL CENTER

Kokomo, IN

for technical competence in the field of

Mechanical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009*).

Presented this 14th day of October 2009.





President & CEO

For the Accreditation Council
Certificate Number 0894.01
Valid to August 31, 2011

For the tests or types of tests to which this accreditation applies, please refer to the laboratory's Mechanical Scope of Accreditation.



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

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RELIABILITY TECHNICAL CENTER
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MECHANICAL

Valid To: August 31, 2011

Certificate Number: 0894.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following tests:

Temperature Steady State Cycle (-70 to 175) °C

Test

Storage Life
High Temp Endurance
High Temperature Bake
Operating Life Test
EEPROM Endurance Test
Operational Life
High Temperature Exposure
Early Life Failure Rate
High Temperature Operating Life
High Temperature Reverse Bias
High Temperature Gate Bias
Intermittent Operational Life
High Temperature
Low Temperature
Low Temperature Endurance
Temperature Cycling
Temperature Cycling
Temperature Cycling
Temperature Cycling
Temperature Cycling
Power Temperature Cycling
Power Temperature Cycling
Power Temperature Cycling
Preconditioning
Preconditioning

Test Method

Q1000 Method 100
GM9123P
CDF-AEC-Q100; EIA/JESD22-A-103
Q1000 Method 103
Q1000 Method 122
CDF-AEC-Q200; MIL-STD-202 Method 108
CDF-AEC-Q200; MIL-STD-202 Method 108
CDF-AEC-Q100; EIA/JESD22-A-108
CDF-AEC-Q100; EIA/JESD22-A-108
CDF-AEC-Q101; EIA/JESD22-A-108
CDF-AEC-Q101; EIA/JESD22-A-108
CDF-AEC-Q101; MIL-STD-750 Method 1037
MIL-STD- 810 Method 501
MIL-STD- 810 Method 502
GM9123P
Q1000 Method 101
CDF-AEC-Q100; EIA/JESD22-A-104
CDF-AEC-Q101; EIA/JESD22-A-104
CDF-AEC-Q200; EIA/JESD22-A-104
SAE J1211
Q1000 Method 102
GM9123P
CDF-AEC-Q100; EIA/JESD22-A-105
CDF-AEC-Q100; EIA/JESD22-A-112
CDF-AEC-Q200; EIA/JESD22-A-113

Temperature Steady State Cycle (-70 to 175) °C

Test (continued)

Preconditioning
Preconditioning
Preconditioning
Cold
Dry Heat
Change of Temperature
Temperature Cycling
Temperature Life
Change of Temperature
Oven Aging
Automotive Environmental Cycles
Automotive Environmental Cycles
High Temperature Endurance
Low Temperature Endurance
Power Temperature Cycling
Low Temperature Testing
Temperature Rise
Storage/Functional Temperature Test
Plastics (Hot Cold Cycles)
Resistance to Humidity Hot & Cold Cycles
Leather (Heat Aging)
Cycle Testing
Life Test
Test-to-Failure
High/Low Temp. Soak
Heat Resistance-Short Term
Storage
Test to Failure
Storage Temp (Non-Operating)
Life Test (Operating)
Test to Failure
Final Line Temp Cycle (Operating)
Burn-In
Hi/Low Temperature Soak
Life Test
Test to Failure
Low Temperature Exposure
Low Temperature Operation
High Temperature Exposure
High Temperature Operation
Power Thermal Cycle
Humidity-Temperature Cycle
High Temperature Endurance
Temperature Cycling, Printed Wiring Board
Temperature Testing, Flexible Flat Cable

Test Method

MIL-STD-833 Method 209
Q1000 Method 201
CDF-AEC-Q101; MIL-STD-750 sec. 4.1
IEC 60068-2-1
IEC 60068-2-2
IEC 60068-2-14
SAE J1455
EIA-364-17B
JIS C 0025
GM9504P
GM9505P
GM9610P
GMW3172
GMW3172
GMW3172
GMW3172
GMW3431
GMW3431
LP-463DD-8-02
LP-463LB-12-01
LP-463LB-13-01
LP-463PB-22-01
PF 9688
PF 9688
PF 9688
PF 9179
PF 9179
PF 9179
PF 9179
PF 8982
PF 8982
PF 8982
PF 8982
PF 10511
PF 10511
PF 10511
PF 10511
CETP:00.00-L-412/00.00EA-D11-1
CETP:00.00-L-412/00.00EA-D11-1
CETP:00.00-L-412/00.00EA-D11-1
CETP:00.00-L-412/00.00EA-D11-1
CETP:00.00-L-412/00.00EA-D11-1
CETP:00.00-L-412/00.00EA-D11-1
CETP:00.00-L-412/00.00EA-D11-1
CETP:00.00-L-412/00.00EA-D11-1
IPC-TM-650 sec.2.6.6
IPC-TM-650 sec. 2.6.12

Thermal Shock (-70 to 175) °C

<u>Test</u>	<u>Test Method</u>
Thermal Shock	GM9110P
Temperature Shock	MIL-STD-810 Method 503
Thermal Shock	GM9123P
Thermal Shock	CDF-AEC-Q200; MIL-STD-202 Method 107
Thermal Shock	EIA-364-32B
Thermal Shock	GMW3172
Thermal Shock Test	GMW3431
Thermal Shock	PF 9688
Thermal Shock (Non-Operating)	PF 8982
Thermal Shock	PF 10511
Thermal Shock	SAE J1455
Thermal Shock Resistance	CETP:00.00-L-412/00.00EA-D11-1
Thermal Shock Endurance	CETP:00.00-L-412/00.00EA-D11-1
Thermal Shock & Continuity, Printed Board	IPC-TM-650 sec. 2.6.7
Thermal Shock-Conformal Coating	IPC-TM-650 sec. 2.6.7.1
Thermal Shock-Solder Mask	IPC-TM-650 sec. 2.6.7.3

Humidity – Steady State – Cycle – Transfer (10 to 97)%RH

<u>Test</u>	<u>Test Method</u>
Cycled Temp & Humidity	Q1000 Method 105
Steady State Humidity	Q1000 Method 106
Operating Life-Moisture Resistance	Q1000 Method 112
Sequential Temperature Humidity	Q1000 Method 114
Temp Cycle w/Steady Humidity	Q1000 Method 124
High Humidity High Temp w/bias	CDF-AEC-Q100; EIA/JESD22-A-101
High Humidity High Temp w/bias	CDF-AEC-Q101; EIA/JESD22-A-101
Temperature Humidity Bias	CDF-AEC-Q100; EIA/JESD22-A-110
Temperature Humidity Bias	CDF-AEC-Q101; EIA/JESD22-A-110
Humidity	SAE J1211
Biased Humidity	CDF-AEC-Q200; MIL-STD-202 Method 103
Moisture Resistance	CDF-AEC-Q200; MIL-STD-202 Method 106
Humidity	GM9110P
Humidity	MIL-STD-810 Method 507
Biased Humidity	GM9123P
Dew Point	Q1000 Method 115
Moisture Susceptibility	GM9123P
Humidity-Solder Heat Exposure	Q1000 Method 126
Dam Heat, Steady State	IEC 60068-2-3
Damp Heat, cyclic (12 + 12-hour cycle)	IEC 60068-2-30
Composite Temp, Humidity, Cycle Test	IEC 60068-2-38
Damp Heat, Steady State, Primarily for Equip.	IEC 60068-2-56
Humidity Test	SAE J1211
Humidity Test	SAE J1455
Humidity Test	EIA-364-31B
Accelerated Corrosion	GM9540P
Humidity Heat Cyclic (HCC)	GMW3172
Humidity Heat Constant (HHCO)	GMW3172
Dew test	GMW3172

Humidity – Steady State – Cycle – Transfer (10 to 97)%RH

<u>Test (continued)</u>	<u>Test Method</u>
Moisture Susceptibility (Frost) Test	GMW3172
Humidity Test	GMW3431
Dew Test	GMW3431
Corrosion Susceptibility	LP-461H-97
Resistance to Humidity Hot & Cold Cycles	LP-463LB-12-01
Humidity Cycle	PF 9688
Humidity Soak	PF 9688
Humidity Resistance-Short Term	PF 9179
Humidity Resistance-Long Term	PF 9179
Humidity Soak	PF 8982
Humidity Condensation Testing Profile	PF 8982
Humidity Soak	PF 10511
Humidity-Temperature Cycle	CETP:00.00-L-412/00.00EA-D11-1
85/85 HighTemp./Humidity Endurance	CETP:00.00-L-412/00.00EA-D11-1
Moisture and Insulation Resistance, Printed Boards	IPC-TM-650 sec. 2.6.3

Salt or Water – Fog - Mist – Spray

<u>Test</u>	<u>Test Method</u>
Salt Atmosphere	Q1000 Method 108
Salt Atmosphere	CDF-AEC-Q200; MIL-STD-202 Method 101
Salt Fog	GM9123P
Salt Atmosphere	ASTM B117
Accelerated Corrosion	GM9540P
Salt Spray	SAE J1211
Sea Coast, Humidity, Sunlight Exposure	Q1000 Method 110
Salt Fog	MIL-STD-810 sec. 509
Salt Spray	GM9110P
Salt Fog	IEC 60068-2-11
Kb: Salt Mist, Cyclic (Sodium Chloride Solution)	IEC 60068-2-52
Salt Spray	SAE J1455
Methods of Neutral Salt Spray Testing	JIS Z 2371
Salt Spray (Fog)	GM4298P
Water Fog Humidity Test	GM4465P
Salt Spray Method B	GMW3172
Corrosion (Salt Fog/Salt Spray) Test	GMW3431
Salt Spray (Fog)	PF 9688
Salt Spray	PF 8982
Salt Mist Atmosphere	CETP:00.00-L-412/00.00EA-D11-1

Dust – Using ISO 12103-1, A2 (Fine Grade) of ISO 12103-1, A4 (Coarse Grade)

<u>Test</u>	<u>Test Method</u>
Dust Exposure	GM9123P
Dust Exposure	Q1000 Method 109
Dust	SAE J1211
Dust Test	GM9110P
Dust Test	GMW3172
Dust Test	SAE J1455

Immersion – Water

<u>Test</u>	<u>Test Method</u>
Water Immersion Immersion	Q1000 Method 113 SAE J1211
Water Immersion Immersion	GM9123P SAE J1455
Water Immersion Test Immersion	GMW3431 CETP:00.00-L-412/00.00EA-D11-1
Steam Clean & High Pressure Washing	SAE J1455

Solderability

<u>Test</u>	<u>Test Method</u>
Solderability	Q1000 Method 202
Solder Immersion	Q1000 Method 224
Resistance to Solder Heat	Q1000 Method 104 Condition A
Solderability	MIL-STD-202 Method 208

Mechanical Force – Tensile – Compression – Torque – Impact

<u>Test</u>	<u>Test Method</u>
Lead Pull Test	Q1000 Method 206
Terminal Strength for SMD	Q1000 Method 217
Break Strength for SMD	Q1000 Method 218
Lead Bend Test	Q1000 Method 205
Terminal Retention	GM9123P; PF 9590
Connector Mating	GM9123P; PF 9590
Connector Retention	GM9123P; PF 9590
Connector Disengage	GM9123P
Mating & Un-mating Forces Test for Electrical	EIA-364-13B
Terminal Retention Force Test	GMW3172
Connector Mating Force Test	GMW3172
Connector Retention Force Test	GMW3172
Connector Disengage Force Test	GMW3172
Crush Test	GMW3172
Bracket Retention	GMW3431
Terminal Retention	GMW3431
Connector Insertion	GMW3431
Connector Retention	GMW3431
Cover to Base Retention	GMW3431
Cover Strength	GMW3431
Switch Body Insertion	GMW3431
Switch Body Retention	GMW3431
Mechanical Over Load	GMW3431
Connector Push Test	CETP:00.00-L-412/00.00EA-D11-1
Connector Torque Test	CETP:00.00-L-412/00.00EA-D11-1
Connector Durability Test	CETP:00.00-L-412/00.00EA-D11-1
Lead/Lock Pull Test	CETP:00.00-L-412/00.00EA-D11-1

Compatibility / Resistance / Exposure to Fluids – Water – Solvents

<u>Test</u>	<u>Test Method</u>
Fluid Compatibility	GM9110P
Resistance to Chemicals	Q1000 Method 214
Conformal Coating Compatibility	Q1000 Method 232
Water Drip	GM9123P
Fluid Compatibility	GM9123P
Cleaning/Solvent Resistance	GM9900P
Fluid Compatibility/Damageability Test	GMW3172
Fluid Compatibility	GMW3431
Solvent Wipe Resistance	LP-463PB-07-01
Fluids Resistance	LP-463PB-31-01
Salt Water Immersion	PF 9688
Resistance to Fluids/Splash	PF 9688
Resistance to Fluids/Spill	PF 9688
Mud Resistance	PF 9688
Resistance to Fluids Test-DUT Powered	PF 8982
Resistance to Fluids Test-DUT Un-powered	PF 8982
Chemical Resistance	CETP:00.00-L412/00.00EA-D11-1

Materials Test

<u>Test</u>	<u>Test Method</u>
Finish Adhesion	Q1000 Method 116
Scratch and Mar	Q1000 Method 404
Abrasion	GM9110P
Resistance to Scuffing	SAE J365
Resistance to Crocking	SAE J861
Steam Cleaning & High Pressure Washing	SAE J1455
Colorfastness to Crocking	GM9033P
Thermal Oxidative Stability of Plastics	GM9059P
Tape Adhesion	GM9071P
Corrosion Creep Back	GM9102P
Compatibility of Vinyl & Leather	GM9141P
Resistance to Marring or Scuffing	GM9150P
RCA Wear Test	GM9304P
Knife Cross-hatch Adhesion Test	GM9502P
Dime Scrape	GM9506P
Thumbnail Hardness	GM9507P
Solvent Rub	GM9509P
Scab Corrosion Creep Back	GM9511P
Abrasion Resistance (Taber)	GM9515P
Paint Adhesion Test Method A	GMW3431
Plastics (Mandrel Bend Test Cold)	LP-463DD-7-01
Adhesion and Toughness	LP-463PB-15-01

Inspection / Evaluations-Visual – Functional – Parametric

<u>Test</u>	<u>Test Method</u>
Internal Visual; External Visual	Q1000 Method 228 & 201
Surface Ion Contamination	Q1000 Method 119
Function check	GMW3431
Appearance	GMW3431
Rattle Evaluation	GMW3431
Odor	LP-463KC-9-01

Flammability

<u>Test</u>	<u>Test Method</u>
Flammability	GM9070P, GM9123P
Flammability	Q1000 Method 120
Flammability	FMVSS 302
Flame Retardance	Q1000 Method 311
Flammability of Materials	GM6090M
Flame Retardance	CDF-AEC-Q200-001
Flammability of Polymeric Int. Materials	SAE J369
Flammability Test	GMW3172, GMW3431

Mechanical Durability- Cycling – Endurance – Drop

<u>Test</u>	<u>Test Method</u>
Push Switch Mechanical Endurance	Q1000 Method 400
Rotation Switch/Control Mechanical Endurance	Q1000 Method 401
Durability – Engage/Disengage	Q1000 Method 403
Mechanical and Contract Life for Relays	Q1000 Method 402
Drop	GM9123P
Drop	GM9110P
Free Fall	GMW3172
Drop Test	GMW3431
Drop	PF 9688
Switch Electrical or Mechanical Life Test	PF 9688
Random Drop	PF 8982
Package Drop	PF 10511
Controls Durability	CETP:00.00-L-412/00.00EA-D11-1
Mechanical Wear-Out	CETP:00.00-L-412/00.00EA-D11-1